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The motivation to act
pro-environmentally
after prolonged claims on
self-control

Abstract

Pro-environmental behaviour benefits society, but often involves incurring some personal costs (e.g., comfort, time or money). Such behaviours therefore rely on people's willingness to forego personal immediate gratification and do things that benefit the environment in the long-term. It has been argued and found that prolonged claims on self-control, which are often necessary, may deplete people's self-regulatory resources and decrease the likelihood that people act in long-term interests. Yet, a recent large-scale replication study revealed that effects of prolonged self-control on behaviour could mostly not be replicated. We propose that the latter can be explained when considering that effects of prolonged self-control on behaviour depend on people's motivation to gain long-term benefits. We tested our motivational account and found that prolonged self-control only inhibited pro-environmental behaviour when people did not strongly endorse biospheric values or when there were no contextual factors that make people focus on benefiting the environment.

5.1 Introduction

Environmental problems, such as global warming, pollution, and the extinction of raw materials are to a large extent caused by human behaviour (Carrico & Riemer, 2011; Steg & Vlek, 2009). Hence, environmental problems can be reduced if people would engage in pro-environmental behaviours, which means behaviour that harms the environment as little as possible or even benefits it (Steg & Vlek, 2009). Behaving pro-environmentally benefits the environment but generally is somewhat costly for an individual (De Groot & Steg, 2009a). For example, taking a short relatively cold shower in the morning would benefit the environment but also involves foregoing a nice and comfortable wake-up. Such behaviours therefore rely on people's willingness to incur some personal costs to benefit the environment in the long term. It has been argued that prolonged claims on self-control, which are often necessary in life, demands self-control, can therefore deplete people's self-regulatory resource and decrease the likelihood that people act in the long-term interest because they are less able to withstand the temptation of immediate gratification (Baumeister et al., 2000; Inzlicht, Schmeichel, & Macrae, 2014; Schmeichel & Vohs, 2009). Indeed, several studies have suggested that prolonged claims on self-control inhibits various behaviours that require foregoing immediate gratification, such as acting selfish instead of acting prosocial (Gino et al., 2011), eating tasty unhealthy food instead of food which is healthier but less tasty (Salmon et al., 2014), or impulse buying which provides you with nice products right now but is harmful for your financial situation in the long-run (Vohs & Faber, 2007). However, a recent large-scale replication study revealed that the negative effects of prolonged claims on self-control could mostly not be replicated (Hagger et al., 2015). How can we explain these seemingly conflicting findings and what does this mean for the likelihood of pro-environmental behaviour after prolonged claims on self-control?

We propose that these seeming conflicting results can be explained by considering self-control as a motivational phenomenon; we will elaborate on this reasoning below. Our theorizing implies that people can be motivated to benefit the environment even though this may be somewhat costly, and even after prolonged claims on self-control. As yet, this motivational account of self-control is mainly based on circumstantial evidence (Gröpel, Baumeister, & Beckmann, 2014; Inzlicht & Schmeichel, 2012; Walsh, 2014) and has not been explicitly tested. The current research extends previous research by providing a first systematic test of the motivational account of effects of self-control on pro-environmental behaviour. Below, we will explain the motivational account of self-control and present our expectations. Next, we report and discuss two studies aimed to test this motivational account and examine which factors can secure or strengthen the motivation to act pro-environmentally even after prolonged claims on self-control.

Prolonged claims on self-control

Prolonged claims on self-control, for example by work-related behaviour while not procrastinating unattractive tasks in the workplace, has been argued to result in a decreased capability to forego immediate gratification (Schmeichel et al., 2003). It was originally theorized that self-control draws on some general finite self-regulatory resource (i.e., limited-resource model: Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000) that replenishes automatically over time or by consuming glucose, but as long as it is depleted it will inhibit

individually costly behaviour with long term and societal benefits (Muraven, Tice, & Baumeister, 1998). While various studies found support for the negative effects of prolonged claims on self-control on different types of behaviours that are not attractive in the short term (e.g., DeWall et al., 2008; Gino et al., 2011; Mead et al., 2009; Sultan et al., 2012; Vohs & Faber, 2007), recent theoretical and empirical analyses have challenged the limited-resource model and even doubted the existence of an effect of prolonged claims on self-control on behaviour all together (Carter & McCullough, 2013; Carter & McCullough, 2014; Carter et al., 2015; Hagger, Wood, Stiff, & Chatzisarantis, 2010; Hagger et al., 2015).

First, meta-analyses suggest that the reported effects of prolonged claims on self-control may be inflated, for example due to publication biases (Carter & McCullough, 2013; Carter & McCullough, 2014; Carter et al., 2015; Hagger et al., 2010). These findings suggest that the effects of prolonged claims on self-control may not be as prevalent as has initially been argued. Second, it has been theorised that some findings on the effects of prolonged claims on self-control on behaviour cannot easily be explained by the limited resource model. For example, research showed that creating beliefs about unlimited willpower resulted in a less negative effect of prolonged claims on self-control on the performance in a subsequent self-control task (Job, Dweck, & Walton, 2010), that self-affirmation can counter such negative effects (Schmeichel & Vohs, 2009), and that leading people to believe that their persistence would be beneficial prevented that individuals performed less well on cognitive tasks (Muraven & Slessareva, 2003). If self-control relies on a limited resource, it is difficult to explain how changing such perceptions can replenish the self-control capacity (Gröpel et al., 2014; Inzlicht et al., 2014). To explain these findings, it was theorized that reduced self-control is a matter of motivation to forego immediate gratification rather than the exhaustion of a limited self-regulatory resource (Gröpel et al., 2014; Inzlicht & Schmeichel, 2012; Walsh, 2014). Importantly, this would imply that factors strengthening people's motivation to protect the environment can counter the negative effects of prolonged claims on self-control on pro-environmental behaviour. The motivational account may explain why many studies did not find negative effects of prolonged self-control on behaviour: people may be motivated to gain long term or collective benefits even after prolonged acts of self-control. Yet, most studies, including the large-scale replication study, examined the effects of prolonged claims on self-control on behaviour without explicitly studying the underlying processes or without studying whether motivations to engage in the specific behaviour would moderate the effect. Typically, participants engaged in a self-control task at time 1, after which performance on a subsequent self-control task at time 2 was measured. The process behind any effects of prolonged claims on self-control on behaviour was inferred and not explicitly investigated.

Hence, the question remains whether effects of prolonged self-control depend on the motivation to gain long term or collective benefits. If self-control is indeed a matter of motivation and if motivation would moderate the effect of prolonged claims of self-control on pro-environmental behaviour, the negative effects of prolonged acts of self-control on pro-environmental behaviour would be less likely among those who are motivated to benefit the environment. We elaborate on our reasoning below.

Motivation to benefit the environment

We propose that the presumed negative effects of prolonged claims on self-control on pro-environmental behaviour may depend on the extent to which people are motivated to benefit the environment. Based on the Integrated Framework for Encouraging Pro-environmental behaviour (IFEP: Steg et al., 2014a) we argue that the extent to which people are motivated to benefit the environment and to engage in pro-environmental actions depends on which values they endorse as well as on contextual factors.

Values. Values are defined as general desirable transsituational goals varying in importance, which serve as a guiding principle in people's life (Schwartz, 1992). Values are considered to transcend situations and to be relatively stable over time (Stern, 2000). As such, values reflect what people find important in life in general and therefore make it more likely that factors related to these values more strongly affect behaviour in a given situation. We argue that the extent to which people are motivated to benefit the environment is mainly affected by self-transcendent values. Self-transcendent values imply that people particularly consider consequences beyond their short-term self-interest and primarily consider what would benefit the collective when making choices (Steg et al., 2014b). Research on pro-environmental behaviour has shown that one type of self-transcendent values, notably biospheric values are most consistently and positively related to pro-environmental behaviour (see Steg & De Groot, 2012, for a review).

Biospheric values reflect the extent to which protecting nature and the environment is an important guiding principle in people's life. People with strong biospheric values particularly consider the consequences of their behaviour for the quality of nature and the environment, and are likely to engage in pro-environmental behaviour (Steg et al., 2014b). Individuals who strongly endorse biospheric values are more motivated to benefit the environment in general in many different situations (Ruepert et al., 2016). This suggests that individuals who strongly endorse biospheric values may (still) be motivated to act pro-environmentally, even after prolonged claims on self-control, in comparison to people with weak biospheric values. Hence, we hypothesize that prolonged claims on self-control particularly inhibits pro-environmental behaviour for people with weak biospheric values but less so for people with strong biospheric values.

Contextual factors. Based on the IFEP model we propose that besides values, contextual factors are likely to affect the extent to which people are focused on benefiting the environment in a particular situation and thus the extent to which they are motivated to act pro-environmentally (Ruepert et al., 2015; Steg et al., 2014a). Various factors in the context where choices are made can affect people's focus on benefiting the environment and therefore the motivation to and likelihood of engagement in pro-environmental behaviour. For example, environmental symbols, clearly visible recycling bins, posters of the WWF, or the presence of significant others behaving pro-environmentally can steer people's attention towards benefiting the environment and environmental consequences of choices and therefore increase their motivation to behave pro-environmentally.

We expect that such contextual factors will particularly strengthen people's focus on benefiting the environment among people with relatively weak biospheric values who are a priori less motivated and less likely to focus on the environmental consequences of their behaviour. When biospheric values are strong, people may be more motivated to behave pro-environmentally anyway, while relevant contextual factors may make people with weak

biospheric values more focused on benefiting the environment. Interestingly, repeatedly exerting self-control has been associated with heightened sensitivity to contextual factors (Hofmann, Strack, & Deutsch, 2008). If the effect of prolonged claims on self-control on pro-environmental behaviour is motivational, contextual factors that make people focused on benefiting the environment and strengthen their motivation to behave pro-environmentally could increase the likelihood of pro-environmental behaviour. Hence, we hypothesize that especially when biospheric values are weak, prolonged claims on self-control inhibits pro-environmental behaviour when no relevant contextual factors are present in the choice situation that make people focus on protecting the environment. In other words, we expect that when biospheric values are weak, contextual factors that make people focus on environmental consequences of actions can increase the likelihood of pro-environmental behaviour and guard against the negative effects of prolonged claims on self-control on pro-environmental behaviour, because such contextual factors strengthen one's motivation to behave pro-environmentally.

The present research

In the present research we conducted two experimental studies to test the motivational account of self-control for the first time. We tested if an increase in the motivation to benefit the environment reduces the effects of prolonged claims on self-control on pro-environmental behaviour. We first hypothesize that prolonged claims on self-control inhibits pro-environmental behaviour for people with weak biospheric values but less so for people with strong biospheric values. Second, we hypothesize that when biospheric values are weak, contextual factors that make people focus on benefiting the environment can enhance the motivation to benefit the environment and guard against the negative effects of prolonged claims on self-control on pro-environmental behaviour.

5.2 Study 1

In Study 1, we examined the extent to which biospheric values moderate the relationship between the exertion of prolonged acts of self-control and pro-environmental behaviour. We hypothesized that strong biospheric values weaken the presumed negative effects of previous acts of self-control on pro-environmental behaviour.

Method

Participants and procedure. Respondents completed a questionnaire comprising the experiment via an online survey program (Qualtrics). Respondents received an e-mail with an invitation to complete the online study, in this invitation the study was presented as a study on writing styles and behavioural choices. They could access the study via a link, where instructions of how to complete the study were provided. They also received an e-mail address to contact the researcher for any questions. In total, 49 respondents completed the questionnaire. Of those, 42% were men and 58% were women, varying in age from 16 to 69 years old ($M = 41.0$, $SD = 16.1$). Based on these characteristics, we consider our sample as a convenience sample.

Design and measures

In order to test our first hypothesis we manipulated self-control in a between-subject design (claims on self-control versus no claims on self-control), and measured biospheric values as a continuous predictor variable. Pro-environmental behaviour was the dependent variable⁹.

Claims on self-control. We manipulated claims on self-control in a similar way as Schmeichel and Vohs (2009). Participants were randomly assigned to either a no claims on self-control condition, where participants completed a free-writing task in which they were asked to write a story for 5 minutes, or a claims on self-control condition, where participants completed a regulated writing task in which they received the same instructions with one additional instruction: *‘Very important! For our research it is crucial that you do not use the letters “a” or “n” anywhere in your story’*. Due to this restriction, participants had to exert self-control rather than just freely typing while writing their story. This manipulation has been shown to successfully manipulate claims on self-control (e.g., Schmeichel & Vohs, 2009).

Values. We measured the strength of values with a validated brief value questionnaire (De Groot & Steg, 2007; Steg et al., 2014b). This questionnaire consisted of 16 items representing four types of values: hedonic, egoistic, altruistic and biospheric. Participants rated how important each item is as a guiding principle in their life, on a scale from -1 (opposed to the principles that guide you) up to 7 (of supreme importance as a guiding principle in your life). Biospheric values were measured with four items: respecting the earth, unity with nature, protecting the environment, and preventing pollution. The biospheric values scale showed a high internal consistency ($\alpha = .87$). Therefore we computed the mean score on these items ($M = 4.26$; $SD = 1.16$).

Pro-environmental behaviour. Pro-environmental behaviour was measured by means of product choices for which we asked the respondents to choose between two options of a product. For all product options we had specified a number of characteristics with regard to environmental and quality aspects. One option had more positive environmental aspects (e.g., sustainable production process, packaging, or possibility to recycle) and one option had more positive user comfort characteristics (e.g., ease of use, larger storage capacity). In total four products had to be chosen that are typically not bought on a regular basis (i.e., bicycle, kettle, tablet, and jeans¹⁰), to increase the likelihood that respondents would process the information on the product characteristics provided. Respondents indicated for all these products which of the option they preferred. We counted the number of times the respondents preferred the pro-environmental option ($M = 2.80$, $SD = 1.02$).

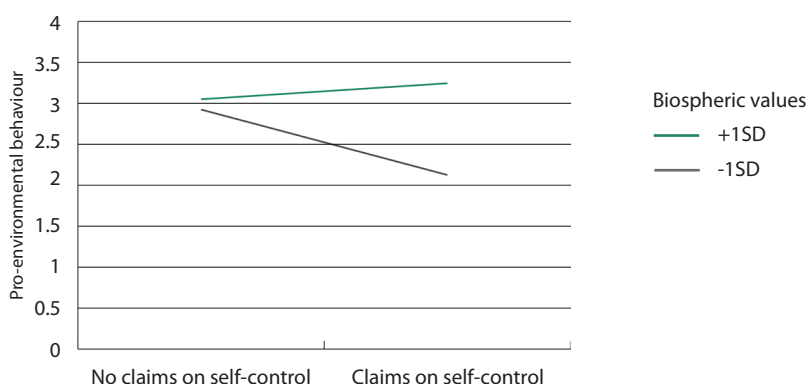
⁹ The experiment contained two additional conditions that are not relevant for the current study and are therefore not reported here. Notably, we manipulated a descriptive social norm to behave pro-environmentally. There was no effect of this manipulation.

¹⁰ In addition, the study contained four products that are bought on a regular basis (i.e., orange juice, coffee, cheese and detergent). Results for these products are not reported here, because control questions to test the extent to which the participants had processed the information showed that the information for the products that are bought on a regular basis was not processed as well as the information for the products that are not bought on a regular basis. A control question on the currently included product choices (e.g., ‘On what characteristics do the different bicycles you could choose from differ?’) showed that 78% of the participants answered this question correctly. A control question on the products that are bought on a regular basis (e.g., ‘From which countries did the oranges come that were used in the production of the orange juices you could choose from?’) showed that 53% answered this question correctly.

Results and Discussion

To test the main effects of claims on self-control and biospheric values on pro-environmental product choices, we included both the manipulation of claims on self-control and biospheric values in a regression analysis. We did not find a significant main effect of claims on self-control on pro-environmental product choices ($\beta = -.15$, $t(48) = -1.07$, $p = .29$, 95% CI $[-.04, .54]$, $d = .44$): participants who had to exercise self-control did not choose significantly less pro-environmental products ($M = 2.55$, $SD = 1.14$) than participants who were in the no claims on self-control condition ($M = 3.00$, $SD = .88$). We did find that stronger biospheric values resulted in more pro-environmental product choices ($\beta = .33$, $t(48) = 2.36$, $p < .05$). Next, we used the Hayes PROCESS macro (Model 1: Hayes, 2012) to conduct the multiple regression analyses in which we examined the effect of biospheric values on the relationship between claims on self-control and pro-environmental behaviour. The moderating effect of biospheric values on the relationship between claims on self-control and pro-environmental behaviour was marginally significant ($b = .43$, $SE = .24$, $F(3,45) = 3.17$, $p = .08$). We used the pick a point technique to identify the levels of biospheric values at which claims on self-control has a negative effect on pro-environmental product choices in the Hayes PROCESS macro (Model 1: Hayes, 2012)¹¹. The pick a point technique showed that claims on self-control significantly inhibited pro-environmental product choices among participants with relatively weaker biospheric values (below 3.10 on the scale ranging from -1 to 7, which is 1 SD below the mean). In contrast, for individuals with stronger biospheric values, we found no significant effect of claims on self-control on pro-environmental behaviour. Figure 5.1 plots the simple slopes of weak and strong biospheric values based on either 1 SD below or above the mean.

Figure 5.1 The moderation of the effect of claims on self-control on pro-environmental behaviour by biospheric values



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The pick-a-point technique shows what values (levels) of biospheric values define the points of transition between statistically significant and nonsignificant curvilinearity in the relationship between claims on self-control and pro-environmental behaviour (Hayes, 2015). Thus the pick-a-point technique allows for identifying the 95% LLCI and the 95% ULCI of the relationship between claims on self-control and pro-environmental behaviour for different values (levels) of biospheric values, and thus which ones do not include 0.

The results of Study 1 support our assumption that claims on self-control particularly inhibits pro-environmental behaviour for those who are less motivated to benefit the environment, that is, those who do not strongly care about protecting nature and the environment as reflected in relatively weak biospheric values. This suggests that people with relatively strong biospheric values are motivated and likely to behave pro-environmentally, despite having exercised self-control. This is a first indication that effects of claims on self-control depend on motivational factors. People with strong biospheric values may not experience a strong conflict between immediate gratification and environmental consequences when deciding to behave pro-environmentally, because they find environmental consequences important in life and are motivated to act pro-environmentally in general. If self-control is motivational, we expect that people with weak biospheric values can be motivated to behave pro-environmentally after claims on self-control when contextual factors make them focus on environmental aspects of a situation. We designed Study 2 to find out.

5.3 Study 2

The second study additionally examined the extent to which contextual factors can moderate the relationship between claims on self-control and pro-environmental behaviour for people with relative weak biospheric values. We hypothesized that strong biospheric values weaken the negative effects of prolonged claims on self-control on pro-environmental behaviour. We also hypothesized that when biospheric values are weak, contextual factors that make people focus on benefiting the environment can weaken the negative effects of claims on self-control on pro-environmental behaviour.

Method

Participants and procedure. In Study 2 respondents completed a questionnaire comprising the experiment either via an online survey program or by means of a paper version of the same questionnaire. For the online version, participants received an e-mail with an invitation to complete a study on their opinion of what is important in their life. They could access the study via a link, where instructions on how to complete the study were provided. They also received an e-mail address to contact the researcher for any questions. Respondents who participated via the online version were all invited to participate in this study via a flyer they received in their mailbox. The paper version had the same introduction, instructions and contact information. Respondents who participated via the paper version were all invited to participate in this study during a PhD summer school on traffic behaviour. We conducted the analyses with and without the participants who received the paper version of the questionnaire, and found the same pattern of results. Therefore we will present the results from the full sample throughout this paper. In total, 106 respondents participated in the study, of which 73 participants completed the online version, while the other 33 participants filled out the paper version of the questionnaire. Of those 106 respondents 45 were men and 58 were women (three participants did not indicate their gender), varying in age from 16 to 73 years old ($M = 36.5$, $SD = 15.8$). Based on these characteristics, we consider our sample as a convenience sample.

Design and measures

The experiment comprised a 2 (claims on self-control versus no claims on self-control) x 2 (contextual factors focused on the environment versus control) between subjects design, and biospheric values as a continuous predictor.

Claims on self-control and contextual factors. We manipulated claims on self-control in a similar way as in Study 1. To test the effects of contextual factors on pro-environmental behaviour, we manipulated the content of the stories the participants had to write about to be either neutral (control) or environmental. Participants in the control condition were asked to write about a recent trip they made: *'We kindly ask you to write a story about a recent trip you have taken. It may be a trip to Amsterdam, the Waddeneilanden, or to another country – whatever! Please do not think too long, but write what comes to your mind. We will count the amount of words and the amount of correct sentences you used'*. This instruction was adapted from (Schmeichel & Vohs, 2009). Participants in the contextual factors focused on the environment condition were asked to write about what needs to change in the world to reduce environmental problems: *'We kindly ask you to write a story about what needs to change in the world to reduce environmental problems. Please do not think too long, but write what comes to your mind. We will count the amount of words and the amount of correct sentences you used'*.

Values. We measured the strength of values with the same validated brief value questionnaire (Steg et al., 2014b) as in Study 1. The biospheric values scale consisting of 4 items also showed a high internal consistency ($\alpha = .92$). Therefore we computed the mean score on these items ($M = 4.25$; $SD = 1.56$).

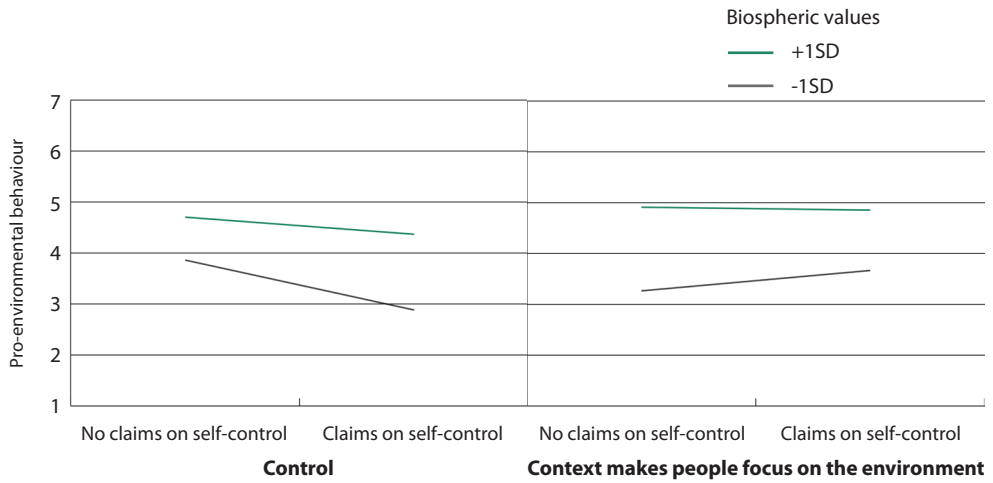
Pro-environmental behaviour. Pro-environmental behaviour was measured via choice scenarios. Respondents read 4 different scenarios and indicated on a scale from 1 (environmental-unfriendly behaviour) to 7 (pro-environmental behaviour) what they would do in the described situation. The 4 scenarios involved behavioural choices concerning cycling through the rain instead of driving in to the supermarket, exposing of paint appropriately by cycling to the waste disposal station that processes chemical waste instead of washing it down the sink, bringing your own bag instead of accepting plastic bags when shopping, and buying a sustainably instead of unsustainably manufactured refrigerator with fewer years of guarantee. An example is: *'Imagine you want to buy a new refrigerator. You can choose between two options: A refrigerator with a 4 year guarantee that is not manufactured environmentally-friendly or a refrigerator with only a 2.5 year guarantee, but which has been manufactured environmentally friendly. What would you do? 1 = Buy the refrigerator with the 4 year guarantee and which has been manufactured environmentally unfriendly, 7 = Buy the refrigerator with the 2.5 year guarantee and which has been manufactured environmentally friendly'*. Pro-environmental behaviour was operationalized as the intention to choose the environmentally-friendly option in the different scenarios, by computing the mean score across scenarios. Higher scores on pro-environmental behaviour reflect a higher intention to behave pro-environmentally. The reliability of the resulting scale was not very high ($\alpha = .51$). Therefore, we ran the analysis with the different types of choice scenarios separately as well as the mean score across scenarios. As the pattern of results were very similar for the different indicators of pro-environmental behaviour, we only report the analyses with overall pro-environmental behaviour as the dependent variable ($M = 4.03$, $SD = 1.36$).

Results and Discussion

First, we examined the effect of biospheric values on the relationship between claims on self-control and pro-environmental behaviour, as measured in choice scenarios. We found no significant main effect of claims on self-control ($\beta = -.14$, $t(103) = -1.61$, $p = .11$, 95% CI $[-.82, .09]$, $d = .28$): participants who were in the self-control condition ($M = 3.85$, $SD = 1.47$) did not make significant less pro-environmental choices than participants who did not exercise self-control condition ($M = 4.23$, $SD = 1.21$). We did find a significant main effect of biospheric values on pro-environmental choice. Participants who strongly endorse biospheric values were more likely to choose pro-environmental options than participants with weak biospheric values ($\beta = .50$, $t(103) = 5.95$, $p < .001$). In contrast to our expectation, we did not find biospheric values to be a significant moderator of the relationship between claims on self-control and pro-environmental behaviour ($b = .21$, $SE = .21$, $p = .33$). When we used the pick a point technique we found that participants with weak biospheric values (below 4.13 on the scale ranging from -1 to 7) are less likely to behave pro-environmentally when they exerted self-control, while claims on self-control did not inhibit pro-environmental actions among those with strong biospheric values.

When we included contextual factors in the analyses, we found that biospheric values and contextual factors were no significant moderators of the relationship between claims on self-control and pro-environmental behaviour ($b = .88$, $SE = .08$, $p = .26$). Yet, we specifically expected that only among people with relatively weak biospheric values and in the absence of contextual factors that can make people focus on the environment claims on self-control would inhibit pro-environmental behaviour. Therefore, we used the pick-a-point technique to identify the levels of biospheric values and the presence or absence of contextual factors at which claims on self-control has a significant negative effect on pro-environmental behaviour. In line with our expectations, claims on self-control only resulted in significantly less pro-environmental choices among participants with relative weaker biospheric values (below 4.25 on the -1 to 7 point scale, which is 1 SD below the mean) in the absence of contextual factors that make people focus on the environment. When contextual factors that make people focus on the environment are present, claims on self-control did not lead to significant less pro-environmental choices among those with relatively weaker biospheric values. For respondents with relative strong biospheric values, claims on self-control were not significantly related to pro-environmental behaviour irrespective of contextual factors. These results are in line with our second hypothesis that when biospheric values are weak, contextual factors that make people focus on the environment can enhance people's motivation to behave pro-environmentally and guard against the negative effects of claims on self-control on pro-environmental behaviour. Figure 5.2 plots the simple slopes.

Figure 5.2 The moderation of the effect of claims on self-control on pro-environmental behavior by context factors that make people focus on the environment and biospheric values



5.4 Discussion

Pro-environmental behaviour benefits the environment, but oftentimes also means foregoing immediate gratification. Pro-environmental behaviour therefore often relies on people's willingness to incur some personal costs to benefit the environment in the long term. Several studies have suggested that prolonged claims on self-control may deplete people's self-regulatory resources and thereby decrease the likelihood that they act in the long term interest because they are less motivated to forego immediate gratification. This would mean that people are less likely to behave pro-environmentally after prolonged claims on self-control. Yet, a recent large-scale replication study revealed that effects of prolonged claims on self-control on behaviour could mostly not be replicated. We reasoned that these seeming conflicting findings may be explained by considering that the effects of prolonged self-control on behaviour depend on people's motivation to protect the environment. For this reason, it is important to study the processes underlying effects of self-control on pro-environmental behaviour. We argue that if the consequences of prolonged claims on self-control on pro-environmental behaviour depend on the motivation to protect the environment, people may be motivated to benefit the environment even when this is somewhat costly and even after prolonged claims on self-control. We predicted and found initial evidence that prolonged acts of self-control particularly inhibited pro-environmental behaviour when people did not strongly endorse biospheric values or when contextual factors that make people focus on benefiting the environment were absent, supporting our reasoning that people are motivated to behave pro-environmentally when they strongly endorse biospheric values and when contextual factors make people focus on benefiting the environment.

Overall, we found that the presumed negative effects of prolonged claims on self-control on pro-environmental behaviour were limited. Only under specific conditions did we find some inhibiting effect. Specifically, in Study 1 we found that people with relatively weak biospheric values were more affected by prolonged claims on self-control than people with relatively strong biospheric values, as reflected in sustainable product choices. This suggests that people who are more concerned with protecting nature and the environment are more likely to behave pro-environmentally even after prolonged claims on self-control. Individuals who strongly endorse these biospheric values are more likely to be *a priori* strongly focused on benefiting the environment, making it less likely that prolonged claims on self-control have a negative effect on pro-environmental behaviour than for people with weak biospheric values. Furthermore, in Study 2 we did not find a main effect of claims on self-control on pro-environmental behaviour. Only among people with relative weak biospheric values when there are no contextual factors present that can strengthen people's focus on benefiting the environment, we found that prolonged claims on self-control decreased the likelihood that people engaged in pro-environmental behaviour compared to a situation not preceded by prolonged claims on self-control. This suggests that for people with relative weak biospheric values, who are not *a priori* strongly motivated to benefit the environment, contextual factors that can make people focus on benefiting the environment can strengthen the motivation to behave pro-environmentally, thereby decreasing the likelihood that prolonged claims on self-control inhibits their pro-environmental behaviour.

Previous research tended to study the effects of prolonged claims on self-control on behaviour without studying factors that can explain the underlying process. In contrast, the current studies provide a first empirical test of factors that help explain the motivational process behind the influence of claims on self-control on pro-environmental behaviour. As predicted on the basis of the IFEP model, we found that strong biospheric values and contextual factors that make people focus on the environment decrease the likelihood that prolonged claims on self-control have a negative effect on pro-environmental behaviour, supporting our reasoning that prolonged claims of self-control only inhibit pro-environmental action when people are not motivated to protect the environment. This suggests that self-control is not merely a matter of the depletion of a limited self-regulatory resource, but that prolonged exercise of self-control particularly affects behaviour when people are not strongly motivated to engage in the relevant behaviour. This implies that negative effects on pro-environmental behaviour are not the result of incapability, but rather the effect of choosing not to behave pro-environmentally. This may explain why previous research has found that claims on self-control might have a limited or even no effect on behaviour (Hagger et al., 2015; Xu et al., 2014): in many cases, people may be motivated enough to engage in the desired behaviour, even after prolonged claims on self-control.

The next important question is why a strong motivation results in pro-environmental behaviour even after prolonged claims on self-control. It could be that individuals with relative strong biospheric values are insusceptible for the negative influence of prolonged claims on self-control on pro-environmental behaviour, because they do not experience a conflict between immediate gratification and acting pro-environmentally. For example, because for people with relative strong biospheric values, pro-environmental behaviour is habitual. It may also be possible that among people with relatively strong biospheric values the motivation to forego immediate gratification weakens, but that the effect is not strong enough to negatively influence pro-environmental behaviour.

The results of our experiments should be interpreted with caution given that we have used hypothetical product choices (Study 1) and choice scenarios in which the participants indicated what they would do in certain situations (Study 2). Although these are common approaches, they have been criticized by some scholars. Future studies should focus on actual behaviour as well. Additionally, the moderating effect of biospheric values on the influence of claims on self-control on pro-environmental behaviour (Study 1) and the moderating effect of biospheric values and contextual factors on the influence of claims on self-control on pro-environmental behaviour (Study 2) were not strong and sometimes not statistically significant according to common standards. We used the pick-a-point technique to examine for which levels of biospheric values (and the presence of contextual factors) claims on self-control had a negative effect on pro-environmental behaviour. We found that the effects of prolonged claims on self-control on pro-environmental behaviour were only statistically significant under specific conditions; when biospheric values were relatively weak and in the absence of contextual factors that can make people focus on benefiting the environment. If there is any effect of prolonged claims on self-control on pro-environmental behaviour, the effect is small and large samples are needed to detect it. Future research could test our motivational account further.

Our findings are practically relevant, as it appears that the negative effects of prolonged claims on self-control on pro-environmental behaviour are only present under specific conditions; when the motivation to act pro-environmentally is weak, as reflected in weak biospheric values and the absence of contextual factors that can make people focus on benefiting the environment. This suggests that motivational interventions can prevent negative effects of prolonged claims on self-control. Interventions could be aimed at implementing relevant contextual factors that make people focus on benefiting the environment and therefore strengthening the motivation to behave pro-environmentally. This may be particularly relevant in situations in which prolonged claims of self-control can be expected, such as the workplace. Organization can for example show that they find decreasing their environmental impact important by presenting themselves as such and by implementing policy and procedures to decrease its environmental impact. This could strengthen the focus on benefiting the environment among those working in the organization and increase their motivation to behave pro-environmentally. Intervention can also be focused on strengthening people's biospheric values. Although values are believed to be relatively stable over time, the relative importance of values may be changed, for example when people encounter significant changes in their life and their way of life is threatened (Hansen, Postmes, Tovote, & Bos, 2014; Lindenberg, 2009; Lönnqvist, Jasinskaja-Lahti, & Verkasalo, 2011), or when people's initial values are seriously challenged (Bardi & Goodwin, 2011). It may be that being exposed to contextual factors that can make people focus on benefiting the environment over and over again can challenge weak biospheric values and strengthen biospheric values. Future research is needed to test this.

In sum, our research suggests that prolonged acts of self-control have, if any, only limited negative effects on pro-environmental behaviour. Notably, acts of prolonged self-control do not inhibit pro-environmental behaviour when people are motivated to act pro-environmentally, as reflected in strong biospheric values and when contextual factors make people focus on benefiting the environment. As such, this research can explain why previous studies did not find consistent effects of prolonged claims on self-control on behaviour, as such effects depend on the people's motivation to engage in the relevant behaviour.